US009325098B2

(12) **United States Patent**
Chen et al.

(10) **Patent No.: US 9,325,098 B2**
(45) **Date of Patent: Apr. 26, 2016**

(54) **POWER CONNECTOR**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/705,436**

(22) Filed: **May 6, 2015**

(65) **Prior Publication Data**

US 2016/0093969 A1 Mar. 31, 2016

(30) **Foreign Application Priority Data**

Sep. 30, 2014 (TW) ..... 103133851 A

(51) **Int. Cl.**
H01R 13/44 (2006.01)

(52) **U.S. Cl.**
CPC ***H01R 13/44*** (2013.01)

(58) **Field of Classification Search**
CPC H01R 13/447; H01R 35/04; H01R 31/06; H01R 13/60
USPC 439/131, 136, 172
See application file for complete search history.

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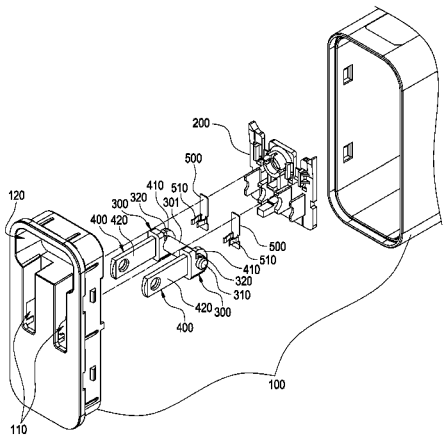
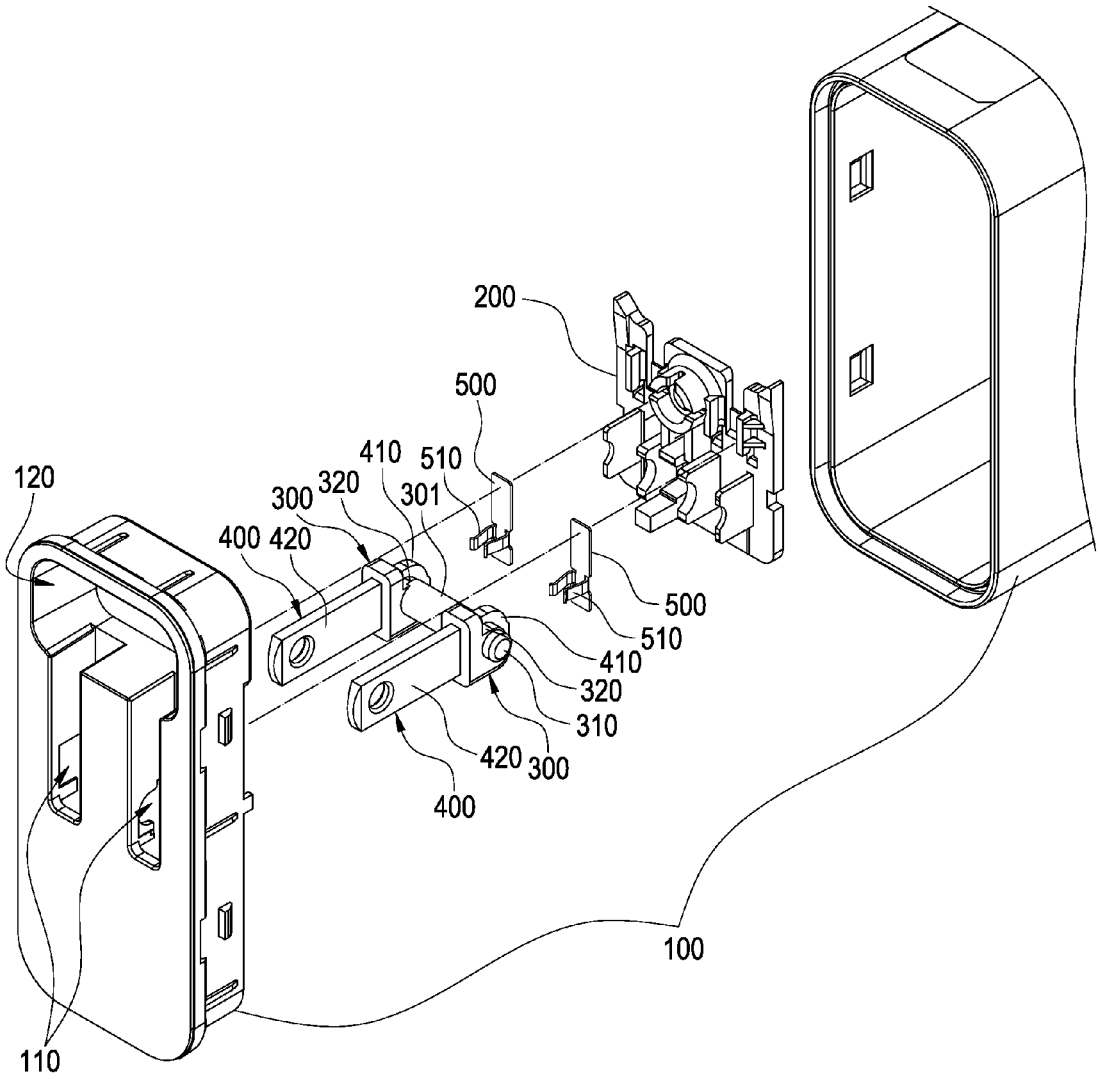
(57) **ABSTRACT**

A power connector includes an insulating base, a pair of rotating seats, a pair of terminals and a pair of electrodes. Each rotating seat is pivotally installed to the insulating base. The terminals are parallel to each other and disposed with an interval apart on each respective rotating seat, such that the terminals may be rotated with respect to the insulating base and selectively to an extended position and a retracted position. The electrodes are installed to the insulating base and configured to be corresponsive to the terminals respectively. A pair of grippers are extended from each electrode, such that when the terminals are rotated, the grippers clamp the respect terminal to maintain an electric connection with the terminal continuously.

15 Claims, 9 Drawing Sheets




200
500
410
510
120
300
320
301
400
420
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510
410
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310
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300
400
100
110

FIG.1

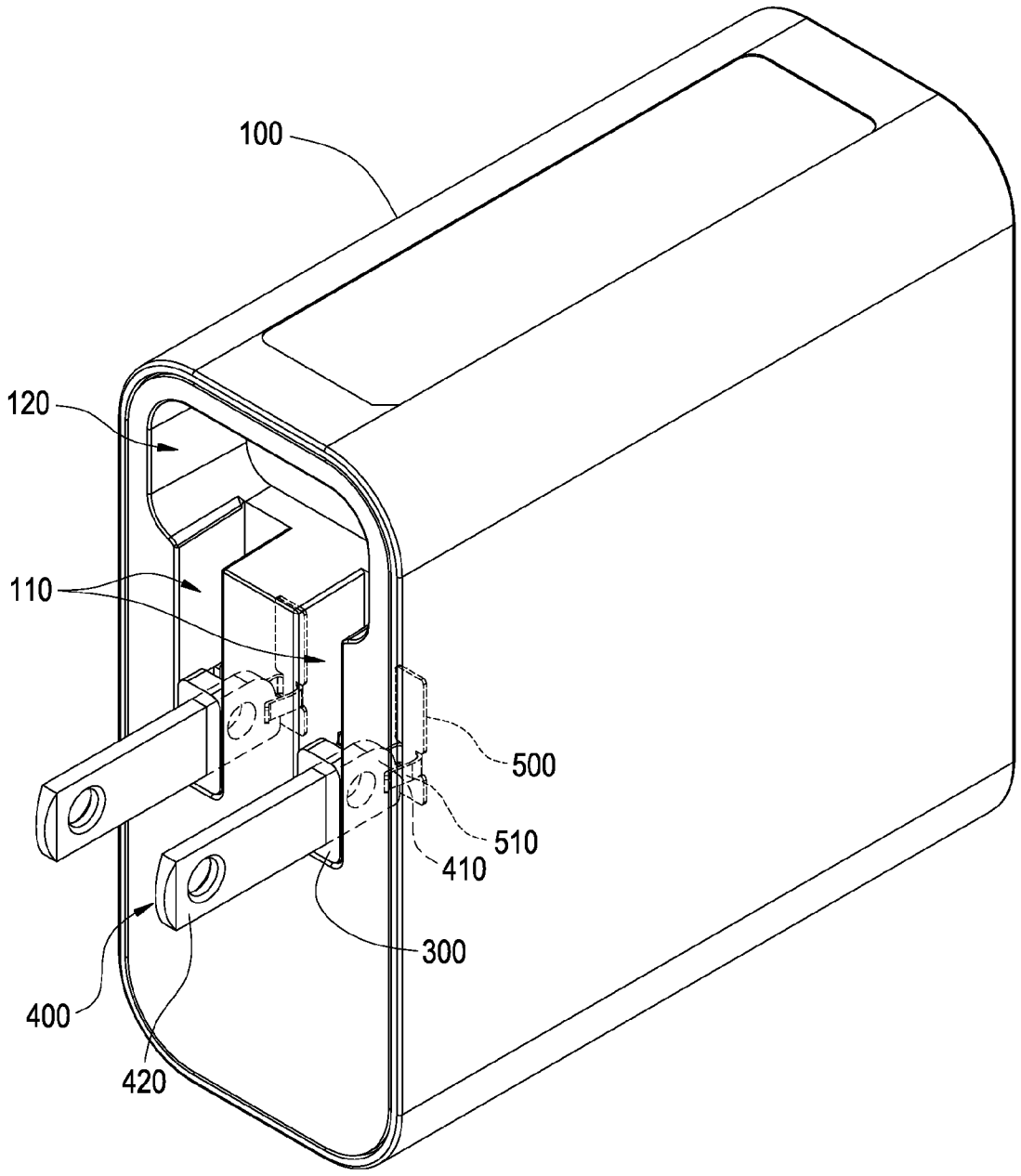

FIG.2

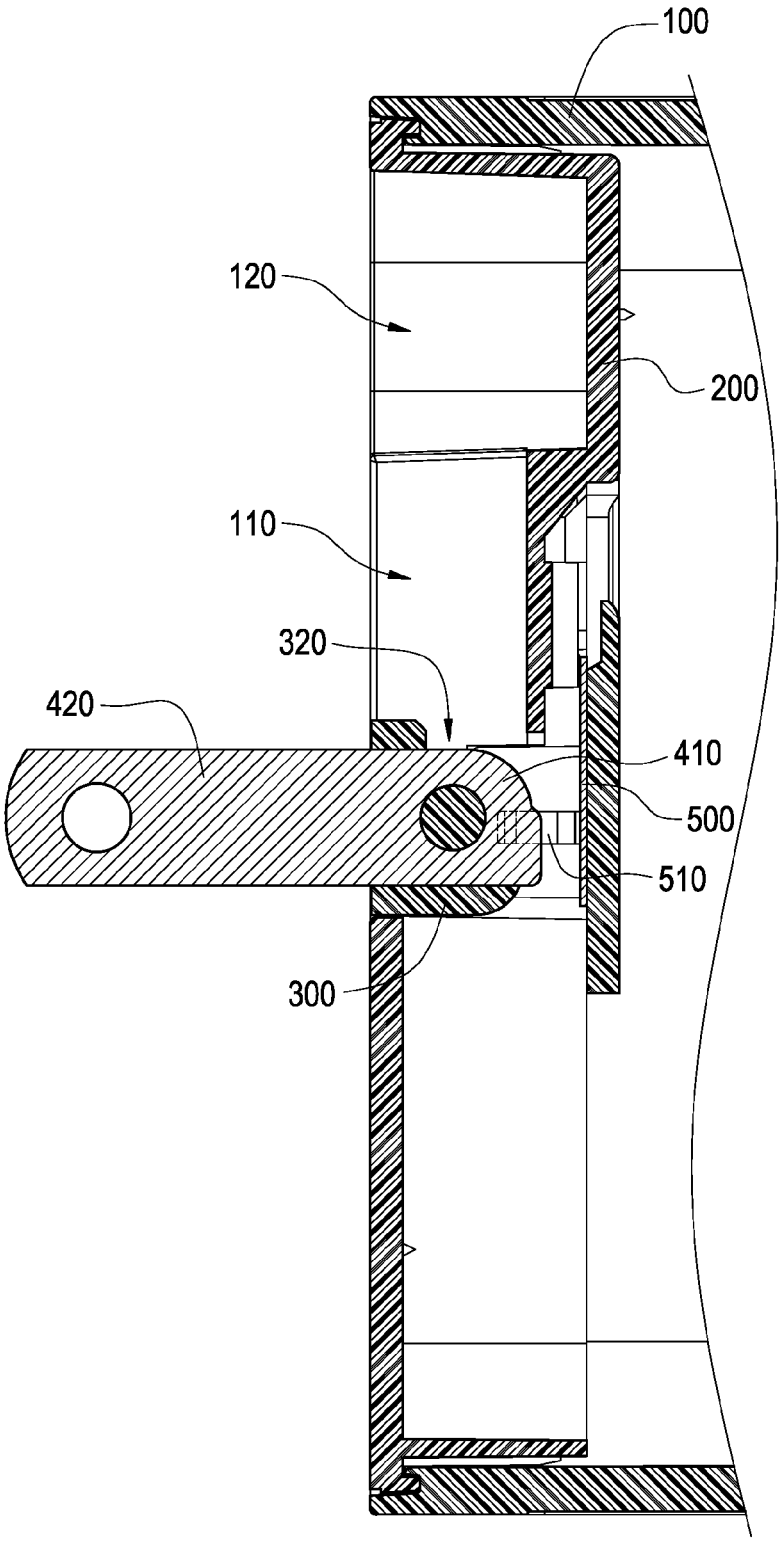

FIG.3

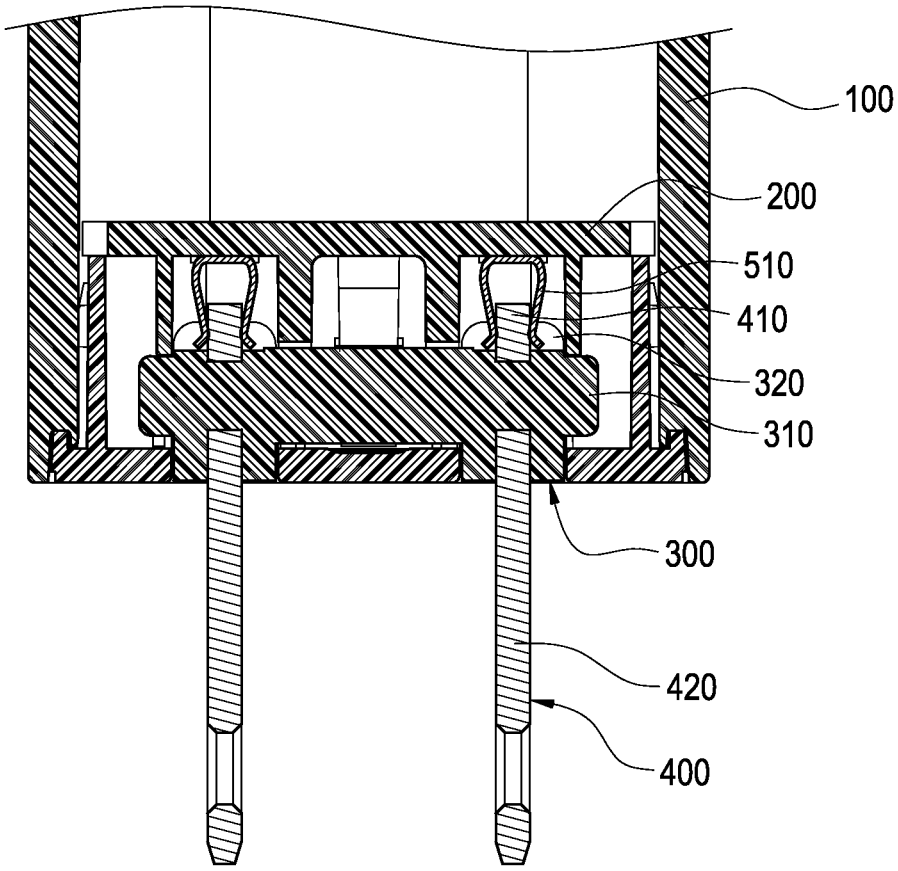

FIG.4

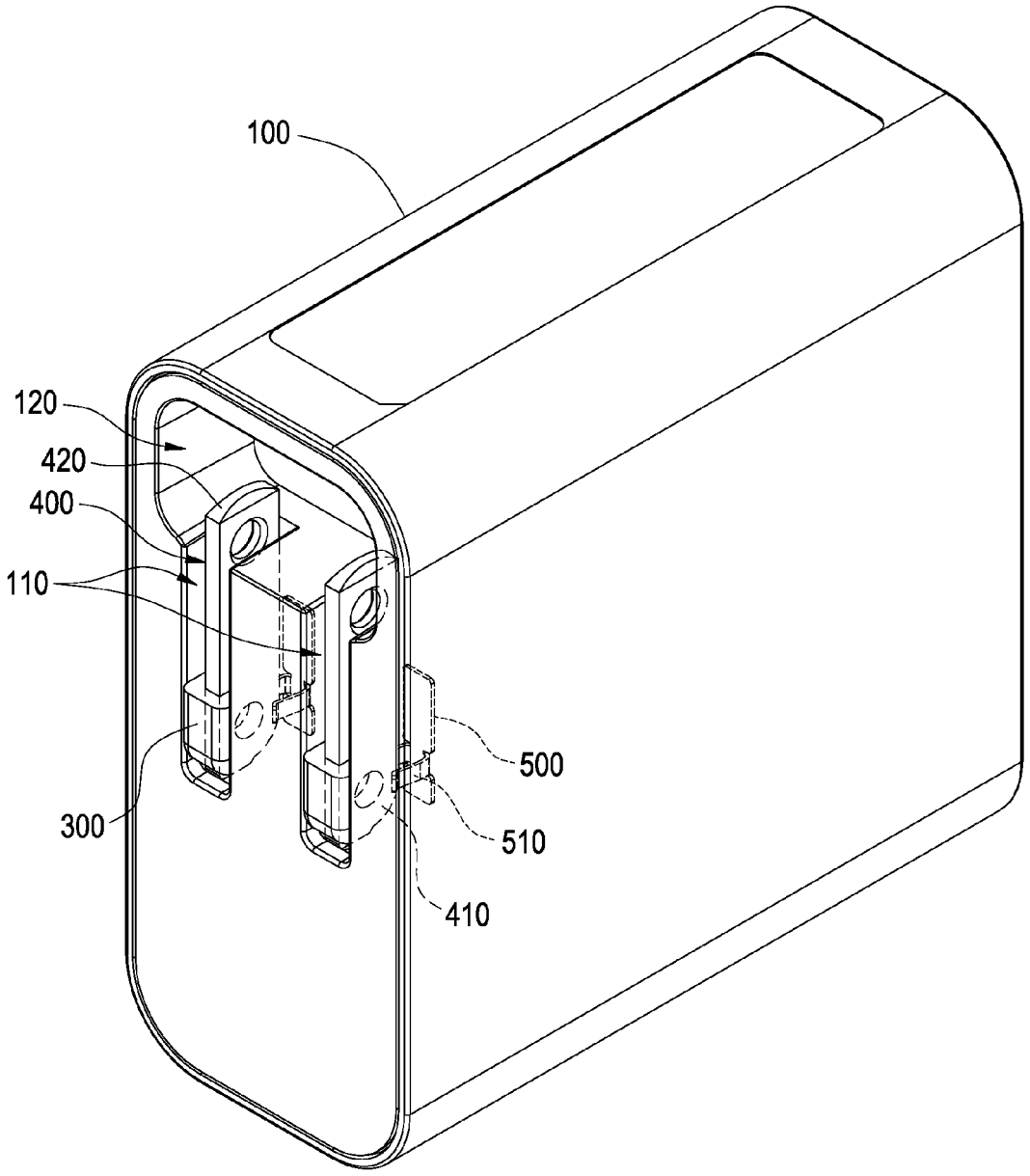

FIG.5

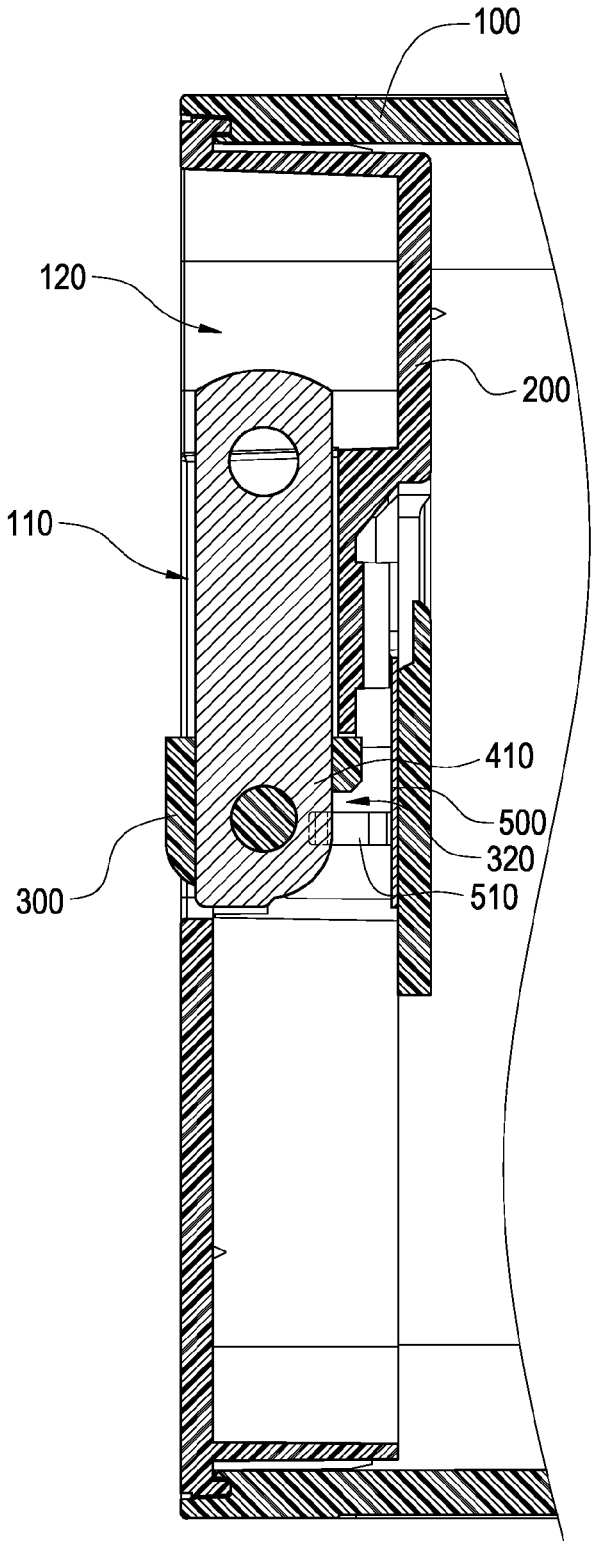

FIG.6

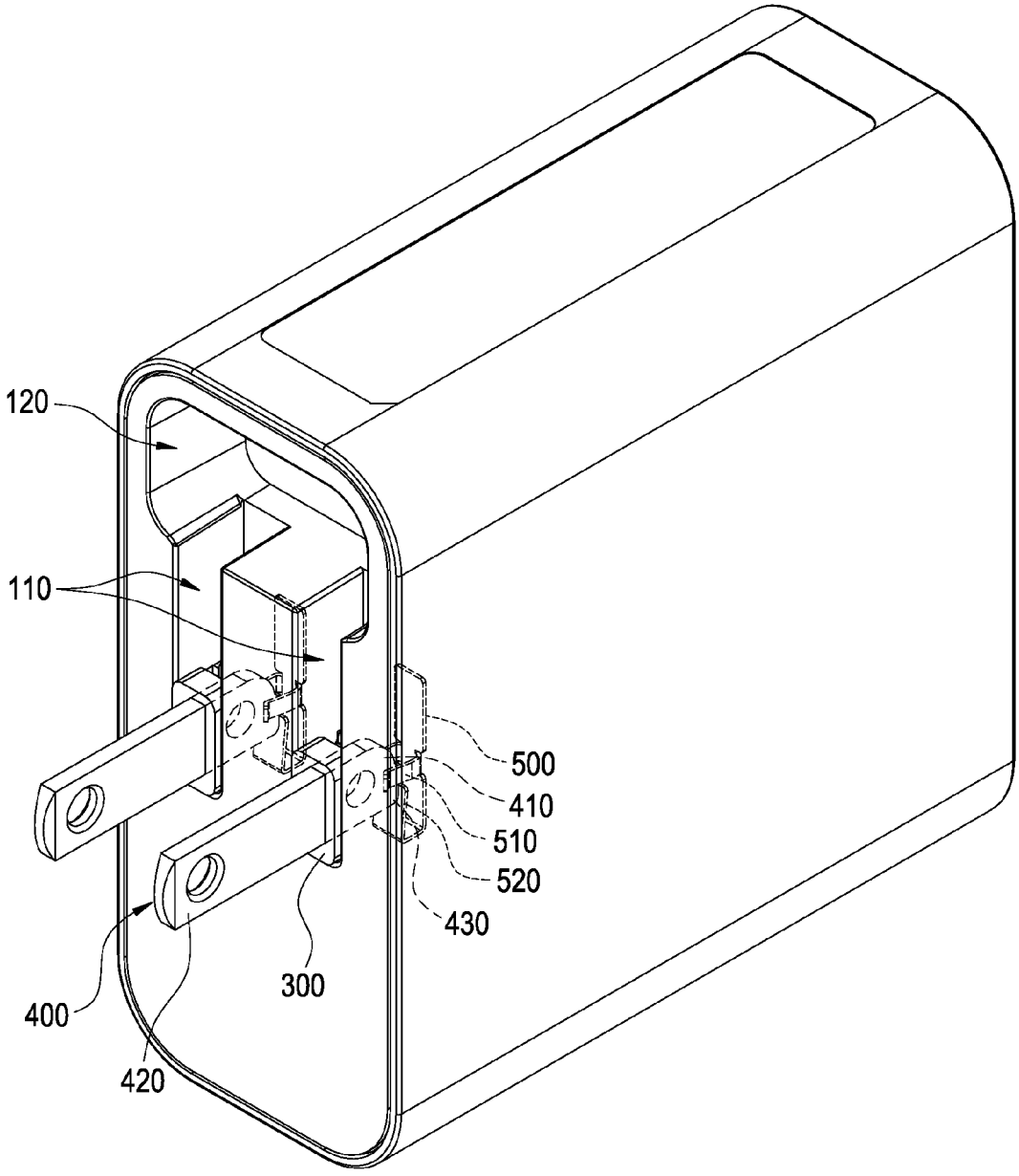

FIG.7

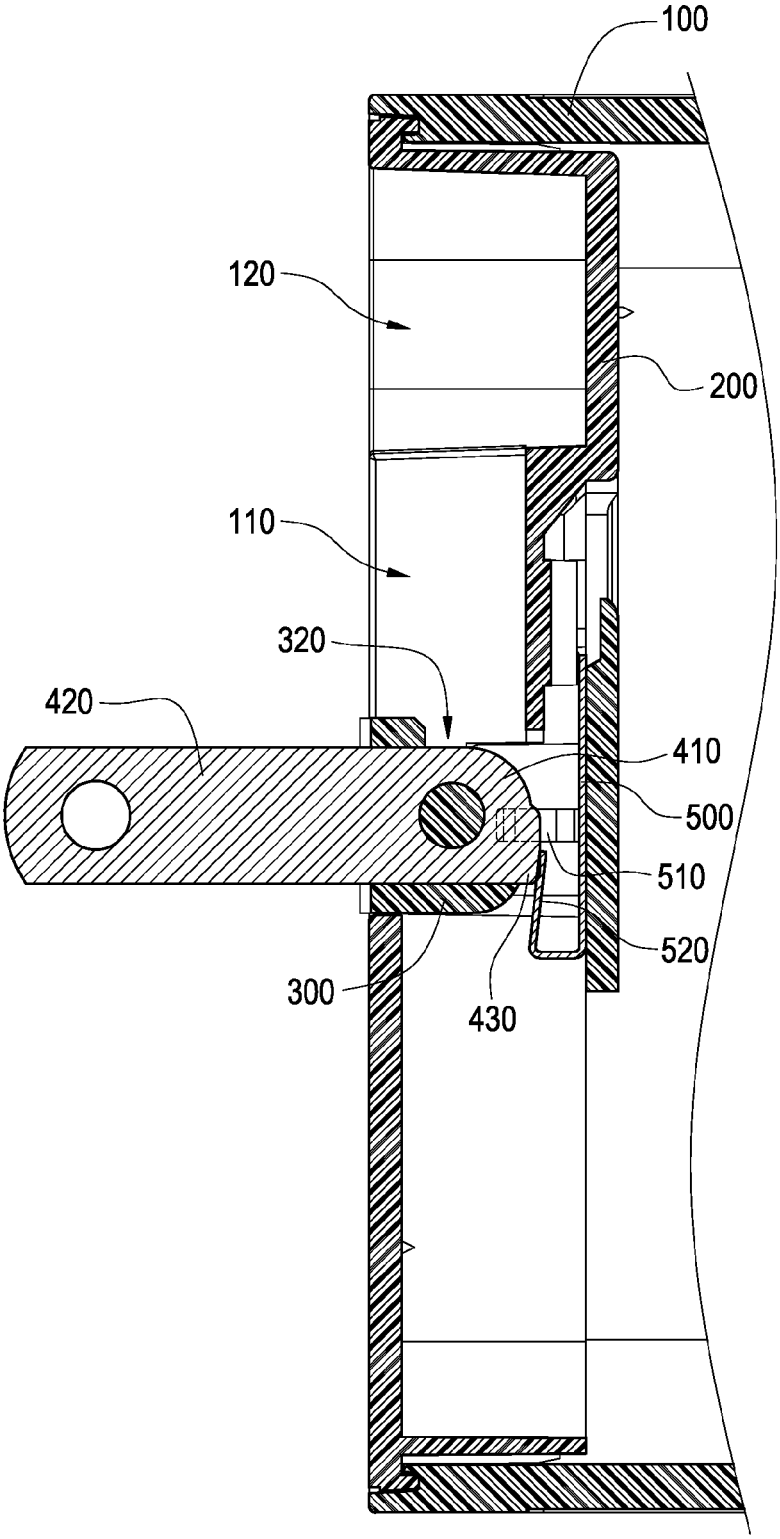

FIG.8

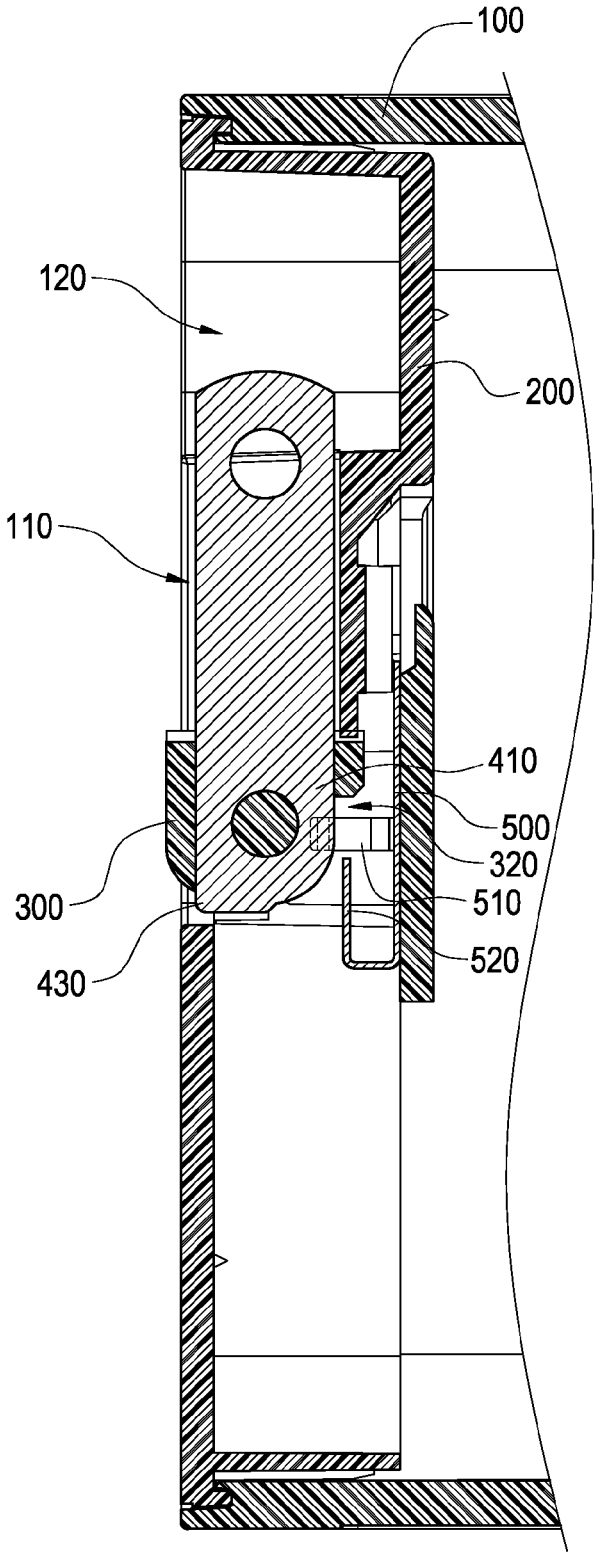

FIG.9

POWER CONNECTOR

FIELD OF THE INVENTION

The present invention relates to a power connector, and more particularly to the power connector with continuously and electrically connected terminals.

BACKGROUND OF THE INVENTION

In general, a conventional power connector is designed integrally with a transformer (or an adapter), and most terminals of the power connector come with a rotary design, and a casing with an accommodating space, so that the terminals may be rotated and stored into the accommodating space. In the design of the conventional power connector, the terminal includes a flange disposed in the casing, and the casing includes an electrode configured to be corresponsive to the flange. When the terminals are extended from the accommodating space to the outside, the flange will be abutted and electrically connected. When the terminals are retracted into the accommodating space, the terminals are separated from electrodes and electrically disconnected. Therefore, when the power connector is loosened and separated, the terminals are rotated to cause an electrical disconnection, and sparks will be produced at the moment when the terminals are contacted and electrically connected to the electrodes.

In view of the aforementioned problems of the prior art, the inventor of the present invention based on years of experience in the related industry to conduct extensive researches and experiments and provide a feasible solution in accordance with the present invention to overcome the problems of the prior art.

SUMMARY OF THE INVENTION

Therefore, it is a primary objective of the present invention to provide a power connector with continuously and electrically connected terminals.

To achieve the aforementioned objective, the present invention provides a power connector, comprising an insulating base, a pair of rotating seats, a pair of terminals and a pair of electrodes. The rotating seats are pivotally installed to the insulating base. The terminals are parallel to each other and disposed with an interval apart from each other at each respective rotating seat, so that the terminals may be selectively rotated to an extended position and a retracted position with respect to the insulating base. The electrode includes an insulating base disposed at a position corresponsive to the terminal, and each electrode has a pair of grippers extended to the outside, such that when the terminal is rotated, the grippers can clamp the terminal continuously.

Preferably, a cam is formed at an end of each terminal, and the grippers can clamp the cam continuously. Preferably, an elastic plate is extended from each electrode, such that when the terminal is situated at the retracted position, the terminal and the elastic plate are separated from each other; and when the terminal is situated at the extended position, each terminal abuts the respective elastic plate. Preferably, a flange is extended from each terminal, such that when the terminal is situated at the extended position, each flange abuts the respective elastic plate. Preferably, the flange and cam of each terminal are installed and connected next to each other. Preferably, the curvature of each extended cam is not less than 90 degrees.

The present invention further provides a power connector comprising: an insulating base; a pair of terminals; and a pair of electrodes. The terminals are installed with an interval apart and parallel to each other, and respectively and pivotally coupled to the insulating base. The electrodes are configured to be corresponsive to the pair of terminals respectively and installed to the insulating base. A pair of grippers are extended from each electrode, and the grippers are in contact with the terminals to form an electric connection, such that when the pair of terminals are rotated, the pair of grippers clamp the terminal to maintain the electric connection continuously.

Preferably, each terminal has a cam formed at an end thereof, and the pair of grippers clamp the cam continuously. Each electrode has an elastic plate extended therefrom, such that when the pair of terminals are situated at a retracted position, the terminals and the elastic plates are separated from each other respectively, and when the pair of terminals are situated at an extended position, each terminal abuts the respective elastic plate. Each terminal has a flange extended therefrom, such that when the pair of terminals are situated at the extended position, each flange abuts the respective elastic plate. The flange and the cam of each terminal are installed and connected next to each other. Each cam is extended with a curvature not less than 90 degrees.

The present invention further provides a power connector comprising an insulating base, and the insulating base further comprises a pair of terminals and a pair of electrodes. The terminals and the electrode are configured to be corresponsive to each other respectively, and each electrode has a pair of grippers extended therefrom and contacted with the pair of terminals respectively to produce an electric connection, such that when the pair of terminals are rotated, the pair of grippers clamp the terminals to maintain the electric connection continuously.

Preferably, a cam is formed at an end of each terminal, and the electrode is in contact with the cam continuously. Preferably, each electrode has an elastic plate extended therefrom, each terminal has a flange extended therefrom, such that when the terminal is situated at the extended position, and each flange abuts the respective elastic plate. Preferably, the flange and the cam of each terminal are installed and connected next to each other. Each cam is extended with a curvature preferably not less than 90 degrees.

In the power connector of the present invention, the electrode has the grippers to clamp the terminals to maintain the electric connection, so that the terminals will not be electrically disconnected during the rotation, and there will be no issue of producing the sparks during the electric connection.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an exploded view of a power connector in accordance with a first preferred embodiment of the present invention;

FIG. **2** is a perspective view of a power connector in accordance with the first preferred embodiment of the present invention;

FIG. **3** is a schematic view of a power connector with an outwardly extended terminal in accordance with the first preferred embodiment of the present invention;

FIG. **4** is another schematic view of a power connector with an outwardly extended terminal in accordance with the first preferred embodiment of the present invention;

FIG. **5** is a schematic view of a power connector with a retracted terminal in accordance with the first preferred embodiment of the present invention;

FIG. **6** is another schematic view of a power connector with a retracted terminal in accordance with the first preferred embodiment of the present invention;

FIG. **7** is a perspective view of a power connector in accordance with a second preferred embodiment of the present invention;

FIG. **8** is a schematic view of a power connector with an outwardly extended terminal in accordance with the second preferred embodiment of the present invention; and

FIG. **9** is a schematic view of a power connector with a retracted terminal in accordance with the second preferred embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The technical contents of the present invention will become apparent with the detailed description of a preferred embodiment accompanied with the illustration of related drawings as follows. It is noteworthy that same numerals are used for representing same respective elements in the drawings.

With reference to FIGS. **1** and **2** for a power connector of the first preferred embodiment of the present invention, the power connector comprises a casing **100**, an insulating base **200**, a pair of rotating seats **300**, a pair of terminals **400**, and a pair of electrodes **500**.

In this embodiment, the casing **100** is preferably an insulating casing made of plastic. The casing **100** has a pair of accommodating slots **110** formed on an external surface of the casing **100** and a connecting slot **120** formed and coupled between the pair of accommodating slots **110**. In this embodiment, both ends coupled to the connecting slot **120** are preferably interconnected to an end of the accommodating slot **110**.

In this embodiment, the insulating base **200** is preferably a base made of plastic, and the insulating base **200** is preferably installed in the casing **100**.

In this embodiment, each rotating seat **300** is preferably a seat made of plastic, and each rotating seat **300** includes a protruding shaft **310** protruded therefrom and a notch **320** formed on each rotating seat **300**. Each rotating seat **300** is pivotally coupled to insulating base **200** through the protruding shaft **310**, and a connecting rod **301** is coupled between the pair of rotating seats **300** for linking and rotating the pair of rotating seats **300**.

With reference to FIGS. **3** to **6**, the pair of terminals **400** are disposed with an interval apart and parallel to each other, and each terminal **400** is installed at each respective rotating seat **300**, and capable of rotating with respective to the insulating base **200** by the rotating seat **300** and selectively to an extended position and a retracted position. In this embodiment, each terminal **400** is a long metal strip, and a middle section of each terminal **400** is buried into the respective rotating seat **300**, and a cam **410** is formed at an end of each terminal **400**, and an insert **420** is formed at the other end of each terminal **400** for plugging into a Mains socket. Each cam **410** is extended with a curvature not less than 90 degrees, and each cam **410** is exposed from each respective notch **320**. Each terminal **400** is passed through the other end of each accommodating slot **110** and out of the casing **100**. When the pair of terminals **400** are situated at the retracted position, each insert **420** is accommodated in each respective accommodating slot **110**, and an end of the insert **420** is exposed from the connecting slot **120** to facilitate users to pull out the insert **420**. When the pair of terminals **400** are situated at the extended position, each insert **420** is protruded from the casing **100**. Preferably, the insert **420** situated at the extended position is perpendicular to the insert **420** situated at the retracted position.

In this embodiment, each electrode **500** is a long metal strip, and each electrode **500** is configured to be corresponsive to each respective terminal **400** and installed to the insulating base **200**, and a pair of grippers **510** are extended from both sides of each electrode **500** and contacted with the terminals **400** respectively to produce an electric connection. When the terminals **400** are rotated, the grippers **510** clamp the cam **410** continuously to maintain the electric connection between the terminals **400** and the electrodes **500** continuously.

With reference to FIGS. **7** to **9** for a power connector in accordance with the second preferred embodiment of the present invention, the power connector comprises a casing **100**, an insulating base **200**, a pair of rotating seats **300**, a pair of terminals **400** and a pair of electrodes **500**.

In this embodiment, the casing **100** is preferably an insulating casing made of plastic. The casing **100** includes a pair of accommodating slots **110** formed on an external surface of the casing **100** and a connecting slot **120** coupled between the pair of accommodating slots **110**. In this embodiment, both ends coupled to the connecting slot **120** are preferably interconnected to an end of each accommodating slot **110**.

In this embodiment, the insulating base **200** is preferably a base made of plastic, and the insulating base **200** is installed in the casing **100**.

In this embodiment, each rotating seat **300** is preferably a seat made of plastic, and each rotating seat **300** includes a protruding shaft **310** protruded therefrom and a notch **320** formed on the rotating seat **300**. Each rotating seat **300** is pivotally coupled to the insulating base **200** through the protruding shaft **310**, and a connecting rod **301** is coupled between the pair of rotating seats **300** for linking and rotating the pair of rotating seats **300**.

The pair of terminals **400** are disposed with an interval apart and parallel to each other, and each terminal **400** is installed to each respective rotating seat **300** and rotated with respect to the insulating base **200** by the rotating seat **300** and selectively to an extended position and a retracted position. In this embodiment, each terminal **400** is a long metal strip, and a middle section of each terminal **400** is buried into the respective rotating seat **300**, and a cam **410** is formed at an end of each terminal **400**, and a flange **430** is extended from the each terminal **400**. The flange **430** and the cam **410** are installed and disposed next to each other, and an insert **420** is formed at the other end of each terminal **400** for plugging into a Mains socket. Each cam **410** is extended with a curvature not less than 90 degrees and exposed from each respective notch **320**. Each terminal **400** is passed through the other end of each accommodating slot **110** and out of the casing **100**. When the pair of terminals **400** are situated at the retracted position, each insert **420** is accommodated in each respective accommodating slot **110**, and an end of the insert **420** is exposed form the connecting slot **120** to facilitate users to pull out the insert **420**. When the pair of terminals **400** are situated at the extended position, each insert **420** is protruded from the casing **100**. Preferably, the insert **420** situated at the extended position is perpendicular to the insert **420** situated at the retracted position.

In this embodiment, each electrode **500** is a long metal strip, and each electrode **500** is configured to be corresponsive to each terminal **400** and installed to the insulating base **200**. A pair of grippers **510** and an elastic plate **520** are formed on both sides of each electrode **500** respectively, and the grippers **510** are contacted with the terminals **400** to produce an electric connection. When the terminals **400** are rotated, the grip-

pers **510** clamp the cam **410** to maintain the electric connection between the terminals **400** and the electrodes **500** continuously. When the terminals **400** are situated at the retracted position, the terminals **400** and the elastic plates **520** are separated from each other. When the terminals **400** are situated at the extended position, the flange **430** of each terminal **400** abuts the respective elastic plate **520** to reduce the contact resistance between the terminal **400** and the electrode **500**.

In the power connector of the present invention, the electrode **500** includes the gripper **510** for clamping the cam **410** of the terminal **400**, so that when the terminals **400** are rotated, the terminal **400** and the electrode **500** are maintained to be electrically connected to each other. There will be no power disconnection during the process of rotating the terminal **400** even if the power connector is loosened. There is no issue of producing sparks during the electric connection of the terminals **400** and the electrodes **500**.

While the invention has been described by means of specific embodiments, numerous modifications and variations could be made thereto by those skilled in the art without departing from the scope and spirit of the invention set forth in the claims.

What is claimed is:

1. A power connector, comprising:

an insulating base;

a pair of rotating seats, respectively and pivotally installed to the insulating base;

a pair of terminals, installed with an interval apart and parallel to each other on each respective the rotating seat, and capable of rotating with respect to the insulating base and selectively to an extended position and a retracted position; and

a pair of electrodes, installed at the insulating base and configure to be corresponsive to the pair of terminals respectively, and a pair of grippers being extended from each electrode, such that when the pair of terminals are rotated, the pair of grippers clamp the terminals to form an electrical connection,

wherein each terminal has a cam formed at an end thereof, and the pair of grippers clamp the cam continuously.

2. The power connector of claim **1**, wherein each electrode has an elastic plate extended therefrom, such that when the pair of terminals are situated at the retracted position, the terminals and the elastic plates are separated from each other respectively.

3. The power connector of claim **1**, wherein each electrode has an elastic plate extended therefrom, such that when the pair of terminals are situated at the extended position, each terminal abuts the respective elastic plate.

4. The power connector of claim **3**, wherein each terminal has a flange extended therefrom, such that when the pair of terminals are situated at the extended position, each flange abuts the respective elastic plate.

5. The power connector of claim **4**, wherein the flange and the cam of each terminal are installed and connected next to each other.

6. The power connector of claim **1**, wherein each cam is extended with a curvature not less than 90 degrees.

7. A power connector, comprising:

an insulating base;

a pair of terminals, installed with an interval apart and parallel to each other, and respectively and pivotally coupled to the insulating base; and

a pair of electrodes, configured to be corresponsive to the pair of terminals and installed to the insulating base, and a pair of grippers being extended from each electrode, and the gripper being in contact with the terminal to form an electric connection, such that when the pair of terminals are rotated, the pair of grippers clamp the terminal to maintain the electric connection continuously,

wherein each terminal has a cam formed at an end thereof, and the pair of grippers clamp the cam continuously.

8. The power connector of claim **7**, wherein each electrode has an elastic plate extended therefrom, such that when the pair of terminals are situated at a retracted position, the terminals and the elastic plates are separated from each other respectively, and when the pair of terminals are situated at an extended position, each terminal abuts the respective elastic plate.

9. The power connector of claim **8**, wherein each terminal has a flange extended therefrom, such that when the pair of terminals are situated at the extended position, each flange abuts the respective elastic plate.

10. The power connector of claim **9**, wherein the flange and the cam of each terminal are installed and connected next to each other.

11. The power connector of claim **7**, wherein each cam is extended with a curvature not less than 90 degrees.

12. A power connector, comprising an insulating base, and the insulating base further comprising:

a pair of terminals and a pair of electrodes, configured to be corresponsive to each other respectively, and a pair of grippers extended from the electrode and contacted with the pair of terminals respectively to form an electric connection, such that when the pair of terminals are rotated, the pair of grippers clamp the terminal to maintain the electric connection continuously,

wherein each terminal has a cam formed at an end thereof, and the pair of grippers clamp the cam continuously.

13. The power connector of claim **12**, wherein each electrode has an elastic plate extended therefrom, each terminal has a flange extended therefrom, such that when the pair of terminals are situated at the extended position, each flange abuts the respective elastic plate.

14. The power connector of claim **13**, wherein the flange and the cam of each terminal are installed and connected next to each other.

15. The power connector of claim **12**, wherein each cam is extended with a curvature not less than 90 degrees.

* * * * *